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INCREASING CLIMATE RESILIENCY THROUGH DISTRIBUTED RENEWABLE ENERGY SYSTEMS

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Electricity is a basic necessity for people in an increasingly global society and economy. In rural Guatemala, small communities can gain access to electricity through connection to a national electric grid, or through distributed resources. In both stand-alone and grid-tied cases, distributed renewable energy (DRE) systems have been used and have been seen to either increase or decrease vulnerability to extreme weather events. This paper explores the role of DRE as a means to adaptation, the indicators that can be used to measure its adaptation effectiveness and a monitoring and evaluation framework. We present several cases, concluding with a recent field study of a comparison between a micro hydroelectric system at a plantation and a connection to the national electric grid in an adjoining community. Analysis shows the hydroelectric system to be more reliable for users than the electric grid during severe weather events, which are increasing in frequency and severity due to climate change. This increased reliability is reflective in part of the physical robustness of the systems – increased rainfall means increased availability of hydro power, but increased chance for damage to power lines from the national grid. It is also reflective of the maintenance and institutional structures of the systems, where a failure of the hydroelectric plant directly affects those who have agency to maintain it, while rural communities are low priorities in restoring power from the national electric grid. We propose that DRE systems be designed with climate change adaptation objectives and indicators in mind, taking advantage of the multiple co-benefits and avoiding trade-offs that increase the vulnerability of their users.

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